

WHAT IS CLAIMED IS:

- 1 1. A microstructure for steering light, the microstructure comprising:
2 a substrate;
3 a first tiltable assembly connected with the substrate, the first tiltable assembly
4 including a reflective coating;
5 a second tiltable assembly connected with the substrate; and
6 first and second electrodes connected with the substrate and respectively
7 configured to tilt the first and second tiltable assemblies upon activation such that the first
8 and second tiltable assemblies are interdigitated.
- 1 2. The microstructure recited in claim 1 wherein the first tiltable
2 assembly is configured as a cantilever arrangement.
- 1 3. The microstructure recited in claim 2 wherein the second tiltable
2 assembly is configured as a torsion-beam arrangement.
- 1 4. The microstructure recited in claim 1 wherein the second tiltable
2 assembly is configured as a torsion-beam arrangement.
- 1 5. The microstructure recited in claim 1 wherein the reflective coating
2 comprises gold.
- 1 6. The microstructure recited in claim 1,
2 wherein the first tiltable assembly includes:
3 a first structural linkage connected with the substrate;
4 a first structural film supported by the first structural linkage and
5 having a plurality of fingers at an end of the first structural film, with the reflective coating on
6 the first structural film; and
7 wherein the second tiltable assembly includes:
8 a second structural linkage connected with the substrate; and
9 a second structural film supported by the second structural linkage and
10 having a plurality of fingers at an end of the second structural film.
- 1 7. The microstructure recited in claim 6 wherein the first and second
2 electrodes comprise polysilicon.

1 8. The microstructure recited in claim 6 wherein the first and second
2 structural films comprise polysilicon.

1 9. The microstructure recited in claim 6 wherein the first structural
2 linkage has a greater height above the substrate than the second structural linkage.

1 10. A method for fabricating a microstructure for steering light, the
2 method comprising:
3 forming a first tiltable assembly on a substrate, the first tiltable assembly
4 including a reflective coating;
5 forming a second tiltable assembly on the substrate; and
6 forming first and second electrodes on the substrate, such first and second
7 electrodes being configured to tilt the first and second tiltable assemblies upon activation
8 such that the first and second tiltable assemblies interdigitate.

1 11. The method recited in claim 10 wherein forming the first tiltable
2 assembly comprises creating a cantilever arrangement.

1 12. The method recited in claim 11 wherein forming the second tiltable
2 assembly comprises creating a torsion-beam arrangement.

1 13. The method recited in claim 10 wherein forming the second tiltable
2 assembly comprises creating a torsion-beam arrangement.

1 14. The method recited in claim 10 wherein the reflective coating
2 comprises gold.

1 15. The method recited in claim 10,
2 wherein forming the first tiltable assembly includes:
3 forming a first structural linkage on the substrate;
4 forming a first structural film on the first structural linkage, the first
5 structural film having a plurality of fingers at an end of the first structural film, with the
6 reflective coating deposited on the first structural film; and
7 wherein forming the second tiltable assembly includes:
8 forming a second structural linkage on the substrate; and

9 forming a second structural film on the second structural linkage, the
10 second structural film having a plurality of fingers at an end of the second structural film.

1 16. The method recited in claim 15 wherein forming the first structural
2 linkage comprises forming the first structural linkage on the substrate at a height greater than
3 the second structural linkage.

1 17. A method for operating an optical switch, the method comprising:
2 tilting a first assembly by applying a first electrostatic force, the first assembly
3 including:

4 a first structural linkage connected with a substrate;
5 a first structural film supported by the first structural linkage and
6 having a plurality of fingers at an end of the first structural film; and
7 a reflective coating on the first structural film;
8 tilting a second assembly by applying a second electrostatic force, the second
9 assembly including:

10 a second structural linkage connected with the substrate; and
11 a second structural film supported by the second structural linkage and
12 having a plurality of fingers at an end of the second structural film; and
13 holding the first and second assemblies electrostatically in a fixed position
14 with the fingers of the first and second structural films interdigitated.

1 18. The method recited in claim 17 wherein the first assembly is
2 configured as a cantilever arrangement.

1 19. The method recited in claim 18 wherein the second assembly is
2 configured as a torsion-beam arrangement.

1 20. The method recited in claim 17 wherein the second assembly is
2 configured as a torsion-beam arrangement.

1 21. The method recited in claim 17 wherein the reflective coating
2 comprises gold.

1 22. The method recited in claim 17 wherein tilting the first assembly
2 comprises tilting the end of the first structural film having a plurality of fingers towards the

3 substrate and tilting the second assembly comprises tilting the end of the second structural
4 film having a plurality of fingers away from the structural assembly.

1 23. A microstructure for steering light, the microstructure comprising:
2 support means;
3 tiltable micromirror means connected with the support means;
4 tiltable snare means connected with the support means; and
5 means for generating electrostatic forces for tilting the tiltable micromirror
6 means and the tiltable snare means into an interdigitated configuration.

1 24. The microstructure recited in claim 23 wherein the tiltable micromirror
2 means comprises cantilever means.

1 25. The microstructure recited in claim 28 wherein the snare means
2 comprises torsion-beam means.

1 26. The microstructure recited in claim 23 wherein the micromirror means
2 comprises torsion-beam means.

1 27. A wavelength router for receiving, at an input port, light having a
2 plurality of spectral bands and directing subsets of the spectral bands to respective ones of a
3 plurality of output ports, the wavelength router comprising:

4 a free-space optical train disposed between the input port and the output ports
5 providing optical paths for routing the spectral bands, the optical train including a dispersive
6 element disposed to intercept light traveling from the input port; and

7 a routing mechanism having at least one dynamically configurable routing
8 element to direct a given spectral band to different output ports depending on a state of the
9 dynamically configurable routing element, wherein the dynamically configurable routing
10 element includes:

11 a tiltable micromirror assembly having a micromirror structural film
12 with a plurality of fingers at an end of the micromirror structural film;

13 a tiltable snare assembly having a snare structural film with a plurality
14 of fingers at an end of the snare structural film; and

15 a plurality of electrodes configured to tilt the micromirror assembly
16 and snare assembly upon activation such that the fingers of the micromirror structural film
17 and snare structural film interdigitate.

1 28. The wavelength router recited in claim 27 wherein the micromirror
2 assembly is configured as a cantilever arrangement.

1 29. The wavelength router recited in claim 28 wherein the snare assembly
2 is configured as a torsion-beam arrangement.